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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/552,383	04/19/2000	Stephen L. Willis	MICRON.092CP1	3147

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EXAMINER
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DIAZ, JOSE R

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 11/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/552,383

Applicant(s)

WILLIS, STEPHEN L.

Examiner

José R Díaz

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RW

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 08 September 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 30-37 and 56-62 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 30-37 and 56-62 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 30-37 and 56-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Denning et al. (US 2002/0092763 A1) in view of Sandhu et al. (US Pat. No. 5,069,002).

Claims 30-32, 34 and 56-58, Denning et al. teaches a method comprising the steps of: forming a dielectric layer (206) of a first thickness on a semiconductor wafer (200) (see Fig. 8); forming an aperture in the dielectric layer (212b) (see fig. 8); positioning a shield layer (210) (see fig. 8); positioning a sacrificial layer (220) (see fig. 10); depositing conductive material (224) (see fig. 11); removing the conductive material and the sacrificial layer using a CMP process (see fig. 11) adapted to remove the conductive material (224) and the sacrificial layer (220) until the shield layer (210) is reached (see Fig. 11), wherein the shield layer (210) is more resistant to planarization by the CMP process than the sacrificial layer (220) (see fig. 11), and wherein the shield layer (220) inhibits thinning of the dielectric layer (210) during the CMP process (see fig. 11 and last two sentences of paragraph [0068])), and wherein interposing the sacrificial layer between the conductive material and the conductive material and the shield layer reduces the amount of conductive material on the shield layer following the CMP

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process (see fig. 11). Furthermore, Denning et al. teaches halting the CMP process when the sacrificial layer (220) has been removed (see last two sentences of paragraph [0068]) so as to maintain the dielectric layer (206) at the first thickness (see fig. 11).

However, Denning et al. is silence with respect to the limitation of detecting when the CMP process has removed the sacrificial layer. Sandhu et al. teach that is well known in the art to perform a sensing step during the CMP process, in which the change in friction is detected by rotating the wafer and polishing surfaces with electric motors and measuring current changes on one or both of the motors (see abstract and col. 3, lines 38-41 and 55-63 and col. 4, lines 28-30).

Denning et al. and Sandhu et al. are analogous art because they are from the same field of endeavor as applicant's invention. At the time of the invention it would have been obvious to a person of ordinary skill in the art to include the step of detecting when the CMP process has removed the sacrificial layer. The motivation for doing so, as is taught by Sandhu et al., is providing a control means for adjusting or stopping the process (abstract). Therefore, it would have been obvious to combine Sandhu et al. with Denning et al. to obtain the invention of claims 30-32.

Regarding claims 33, 35 and 59-60, Denning et al. teaches that the step of forming the shield layer (210) comprises the step of forming a DARC layer (208) on a BPSG dielectric layer (206) (see fig. 8).

Regarding claims 37 and 62, Denning et al. teaches a cavity (212b) filled with the conductive material (224) (see fig. 11).

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 30-37 and 56-62 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 16-28 of U.S. Patent No. 6,576,553 B2. Although the conflicting claims are not identical, they are not patentably distinct from each other because both claim the same invention. It is inherent that the shield layer of patent No. 6,576,553 also inhibits thinning of the dielectric layer during the CMP process.

For example, claims 19 and 20 of Pat. 6,573, 553, teach the required limitations recited in claims 30 and 56 of the present application, respectively. It is noted that Patent 6,573, 553 does not expressly claim the limitations of filling the aperture with the conductive material, and that the shield layer inhibits thinning of the dielectric layer during the CMP process. However, such limitations are inherently recited in the steps of depositing a conductive material in claim 16 (wherein it is noted that the cavity is filled so that an excess of conductive material is positioned the sacrificial layer), and

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detecting when the shield layer is reached in claim 19 (wherein it is noted that the CMP process is stopped as soon as the shield layer is reached).

### ***Response to Arguments***

4. Applicant's arguments with respect to claims 30-37 and 56-62 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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***Correspondence***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to José R Díaz whose telephone number is (703) 308-6078. The examiner can normally be reached on 9:00-5:00 Monday, Tuesday, Thursday and Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



TOM THOMAS  
SUPERVISORY PATENT EXAMINER  
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JRD